United States
Department of
Agriculture

Soil
Conservation
Service

Spokane,
Washington

Water Supply Outlook for Washington

as of JUNE 1, 1981 . . .

in cooperation with

Department of Ecology
State of Washington

GPO 1981 797-080

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and ing, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, imates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are ed principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic tors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. ly season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in untain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and ter equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow rses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent d related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water d other parameters at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on ervoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also luded. The report for Western United States presents a broad picture of water supply outlook conditions, including selected eamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about ery five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 each year.

COVER PHOTO: SNOW SURVEYORS MAKING SPECIAL MEASUREMENTS OF THE SNOWPACK NEAR MT. ST. HELENS VOLCANO, WASHINGTON, APRIL, 1980.

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in peration with state water administrators, agricultural experiment stations and others. Copies of the reports for Western ited States and all state reports may be obtained from Soil Conservation Service, West Technical Service Center, Room 510, N.W. Broadway, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following tes:

STATE	ADDRESS
Alaska	Room 129, 2221 East Northern Lights Blvd., Anchorage, Alaska 99504
Arizona	Room 3008, Federal Building, 230 N. First Ave., Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno, Nevada 89505
Oregon	1220 S. W. Third Ave., Portland, Oregon 97204
Utah	4420 Federal Bldg., 125 South State St., Salt Lake City, Utah 84138
Washington	360 U. S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Snow Surveys Branch, California Department of Water Resources, P.O. Box 388, Sacramento, California 95802 --- for British Columbia by the Ministry of the Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia V8V 1X5 --- for Yukon Territory by the Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory Y1A 3V1 --- and for Alberta, Saskatchewan, and N.W.T. by the Water Survey of Canada, Inland Waters Branch, 110-12 Avenue S.W, Calgary, Alberta T3C 1A6.

WATER SUPPLY OUTLOOK FOR WASHINGTON

and

FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

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SPOKANE, WASHINGTON 99201

WATER SUPPLY OUTLOOK

State of Washington

June 1, 1981

It seems like the last few years have had a huge deficiency of snow as of May 15 and June 1. The years 1979, 1980, and 1981 all had subnormal snowpacks late in the season; but, also they weren't exceptional earlier in the year either. We have managed to get by with our water supply - even 1977, which was very bad, and so we will probably get by again. We have not had good snowpacks throughout the Columbia basin all winter, but there were locations with above normal conditions in Montana and British Columbia. These areas were not large and there wern't too many of them, but they are significant to our water supply along the main stem of the Columbia. Forecasts of water supply are not prepared for any forecast points as of June 1; but if we did, we would probably increase, percentagewise, our forecasts. Rainfall was significantly above average over the basins here in the Northwest, and the runoff was mostly subnormal - the exception being the Columbia out of Canada and the Kettle. The Montana flooding which was in the news, was mostly in the Missouri drainage.

THIS IS THE LAST WATER SUPPLY OUTLOOK REPORT FOR 1981. IF YOU WISH TO RECEIVE THESE REPORTS NEXT YEAR, PLEASE RETURN THE BACK COVER OF THE APRIL 1 REPORT IF YOU HAVE NOT ALREADY DONE SO.

SNOW COVER

Very few snow courses had snow as of May 15 and even less on June 1. The ones that we have records on are all in the high country of Montana and British Columbia. On the Pend Oreille watershed, snow cover was 45 percent of average on May 15 and 46 percent as of June 1. The Kettle snowpack was 83 percent as of May 15 and 77 percent on June 1. The Okanogan drainage was 70 percent for each. Most of the other measurements that were reported as of June 1 were zero and, therefore, not comparable.

RESERVOIRS

The storage picture in the state continues to be the bright spot. All reservoirs are practically full, with well above normal amounts of water in storage. Flood control does not seem to be a problem this year so the multi purpose reservoirs will fill in the next week or two.

PRECIPITATION

During the month of May, rainfall was above normal for all drainage divisions reported by the National Weather Service for Washington and tributary areas. Percentagewise, rainfall ranged from 114 percent for the Southwest Slopes of the Cascades to 236 percent for the Okanogan in Canada. The April-May totals range from 118 percent for the Southwest Slopes to 162 percent for the Pend Oreille-Spokane division.

STREAMFLOW

Local runoff during the month of May was all subnormal. Only outflows from Canada were above average; although some of the flows from Montana were close. Washington runoff ranged from 50 percent of normal for the Klickitat River to 92 percent for the Chelan. Tributary and main stem flows were greater, ranging down from 127 percent of average for the Columbia at Birchbank. Forecasts of streamflow are not made as of June 1.

RESERVOIR STORAGE - 1000 Acre Feet

BASIN OR STREAM	RESERVOIR	USABLE 1/ CAPACITY	Measured June 1 1981	1980	1979	Normal*
		COLUMBIA				
Spokane	Coeur d'Alene Lake	225.1	213.7	242.5	236.2	225.0
Columbia	Franklin D. Roosevelt Lake	5232.0	4845.6	5058.7	3433.6	2565.6
Columbia	Banks Lake	714.9	672.2	680.2	456.6	406.2
Okanogan	Conconully Reservoir	13.0	13.2	13.0	10.5	9.1
Okanogan	Conconully Lake	10.5	10.4	10.5	8.1	9.4
Chelan	Lake Chelan	676.1	653.5	570.6	437.3	450.6
		YAKIMA				
Yakima	Keechelus Lake	157.8	147.4	147.1	157.6	139.6
Kachess	Kachess Lake	239.0	237.2	163.0	236.9	217.1
Cle Elum	Lake Cle Elum	436.9	436.4	436.2	338.0	367.9
Bumping	Bumping Lake	33.7	33.1	33.4	35.1	25.4
Tieton	Rimrock Lake	198.0	193.2	198.8	171.0	160.2
		PUGET SOUND				
Skagit	Ross Reservoir	1404.1	1362.1	1129.5	1107.7	1033.9
Skagit	Diablo Reservoir	90.6	86.7	85.1	87.2	86.1
Skagit	Gorge Reservoir	9.8	7.9	7.2	8.1	8.3

1/ Based on Active Storage

* 15-yr. Average 1963-1977

PRECIPITATION 1/

Division Average Observations and Departures

Drainage Divisions	FALL Sept-Oct Observed	FALL 1980 2/ Departure	WINTER Nov 1980 - Mar 1981 Observed	WINTER Departure	SPRING Apr-May Observed	SPRING 1981 2/ Departure
Columbia in Canada	3.76	-1.26	14.49	-1.02	4.97	+1.50
Pend Oreille - Spokane	2.75	-1.29	15.12	-2.43	6.24	+2.39
Northeastern Washington	2.37	-0.11	8.49	-0.91	4.68	+1.67
Southeastern Washington	2.33	-0.18	11.21	+0.78	3.58	+0.65
Central Washington	1.60	+0.63	5.50	+0.22	1.89	+0.54
North Central Washington	1.45	-0.14	7.16	+0.62	1.70	+0.85
Northwest Slope Cascades	7.35	-5.86	52.10	-3.29	15.52	+5.12
Southwest Slope Cascades	3.89	-4.79	38.40	-3.24	8.63	+1.33

Northeastern Washington - Lower Spokane, Colville, Sanpoil, and Lower Kettle Drainages.

Southeastern Washington - Touchet, Tucannon, and Palouse Drainages.

Central Washington - Yakima, Wenatchee, and Chelan Drainages.

North Central Washington - Methow and Okanogan Drainages.

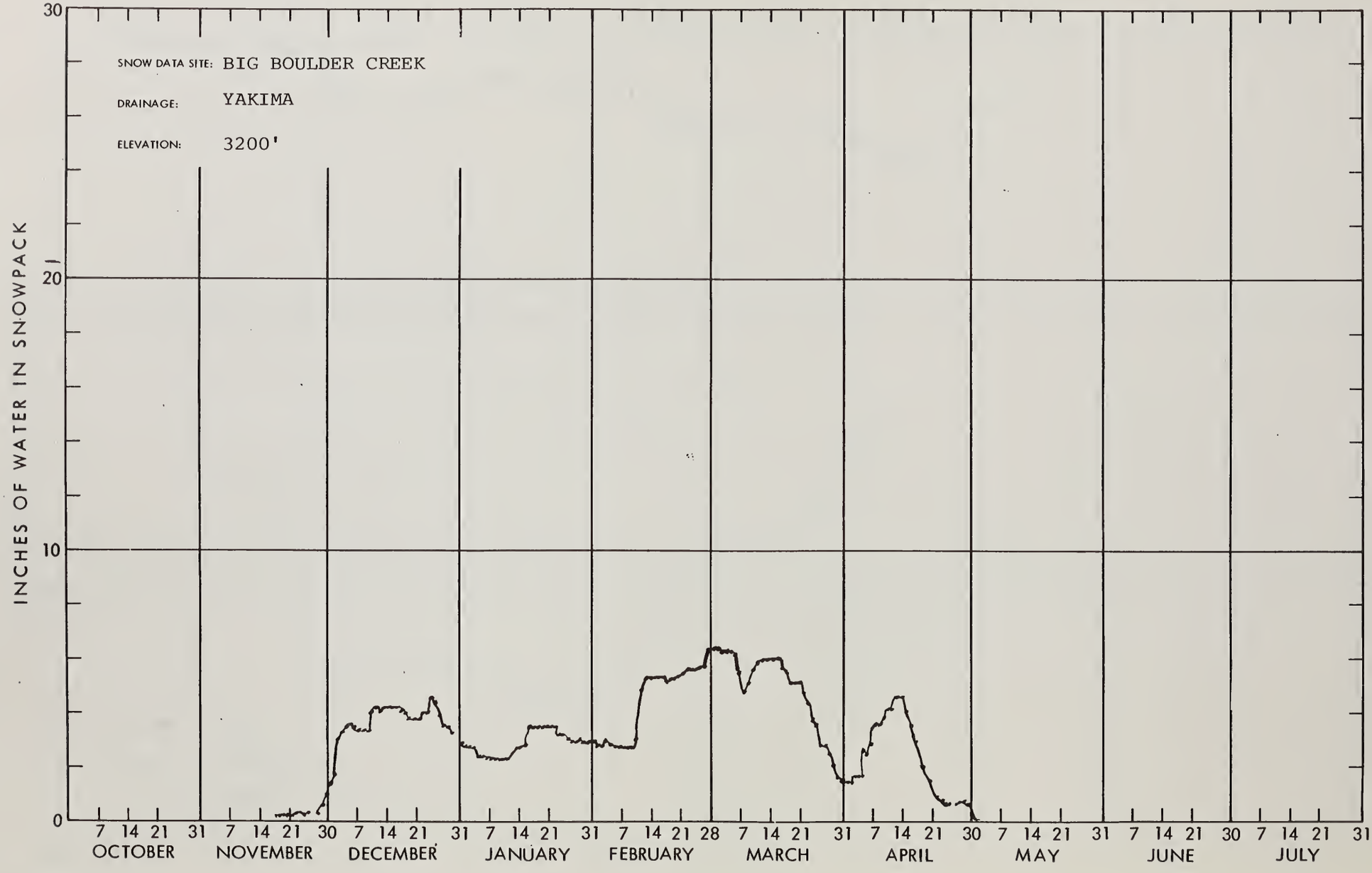
Northwest Slope Cascades - Puget Sound Drainages.

Southwest Slope Cascades - Lower Columbia Drainages.

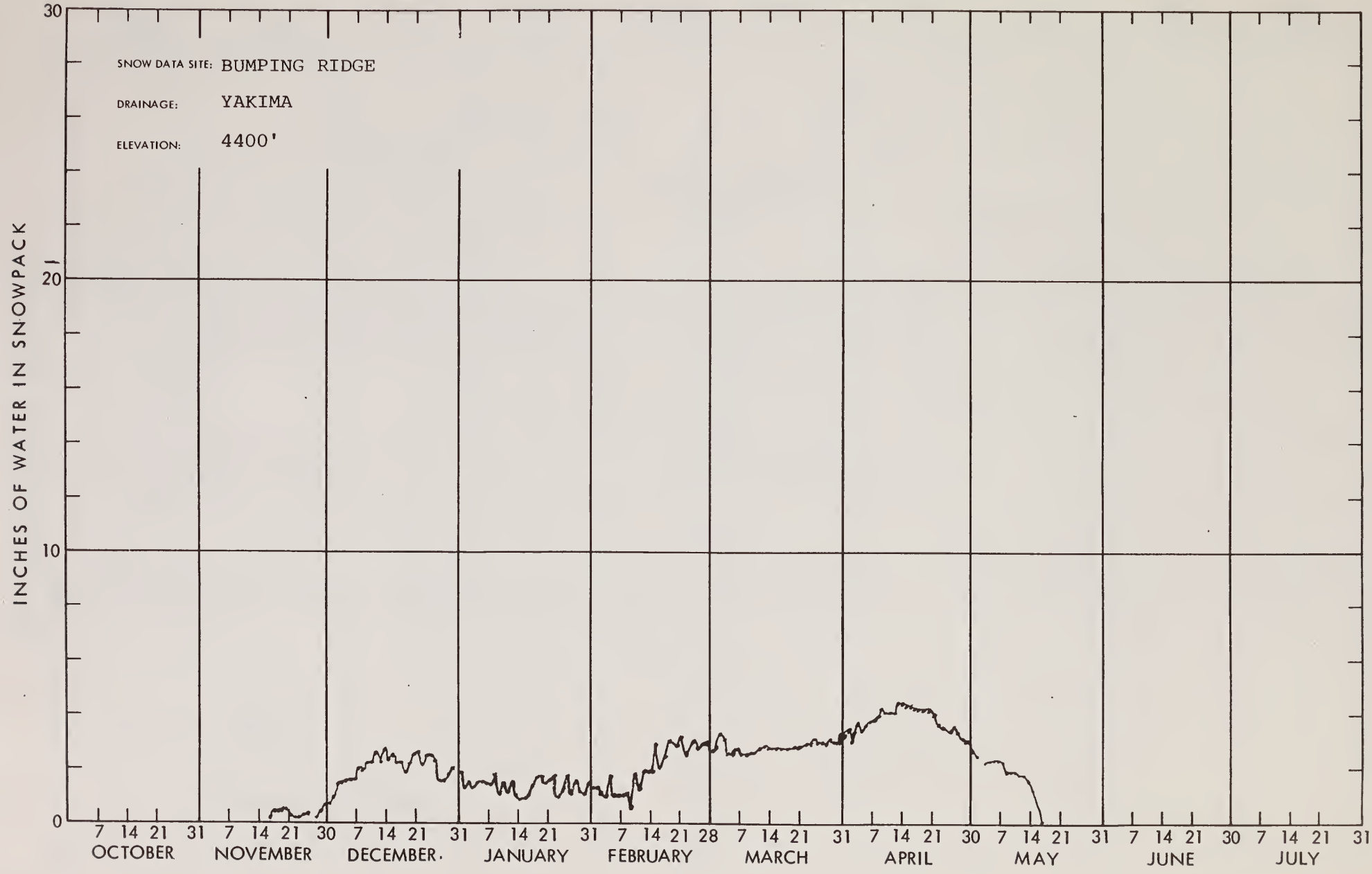
1/ - Preliminary analysis by National Weather Service from data furnished by Meteorlogical Services of Canada and the National Weather Service.

2/ Departure from 15-year (1958-72) drainage division average.

WSFB-X13B


SNOW DATA SITE: BIG BOULDER CREEK
DRAINAGE: YAKIMA
ELEVATION: 3200'
INCHES OF WATER IN SNOWPACK
30
20
10
0
7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 31 7 14 21 28 7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 30 7 14 21 31
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY

WSFB-X13B


SNOW DATA SITE: BUMPING RIDGE
DRAINAGE: YAKIMA
ELEVATION: 4400'
INCHES OF WATER IN SNOWPACK
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7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 31 7 14 21 28 7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 30 7 14 21 31
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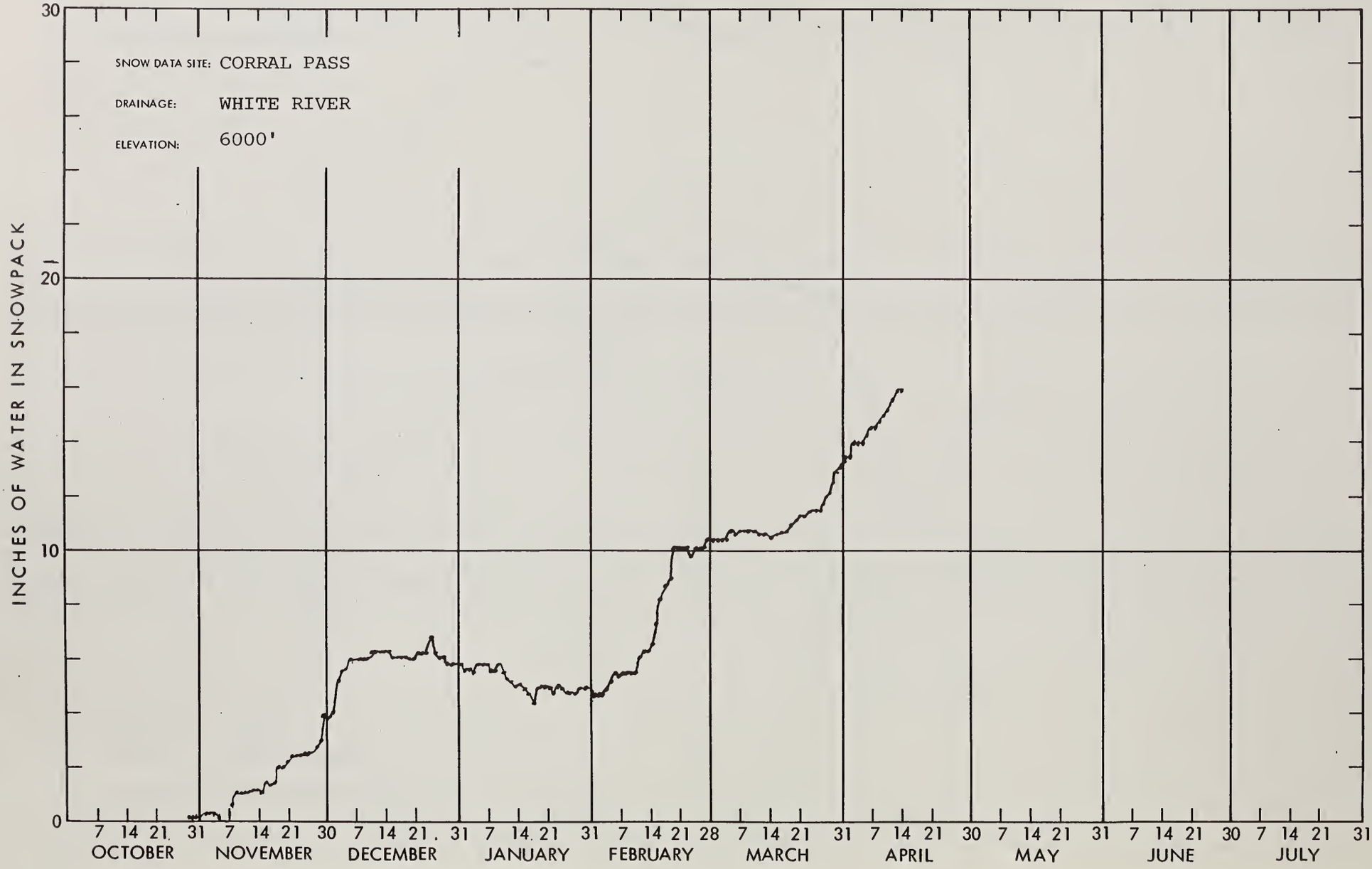
SNOW DATA SITE: CORRAL PASS
DRAINAGE: WHITE RIVER
ELEVATION: 6000'
INCHES OF WATER IN SNOWPACK
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7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 31 7 14 21 28 7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 30 7 14 21 31
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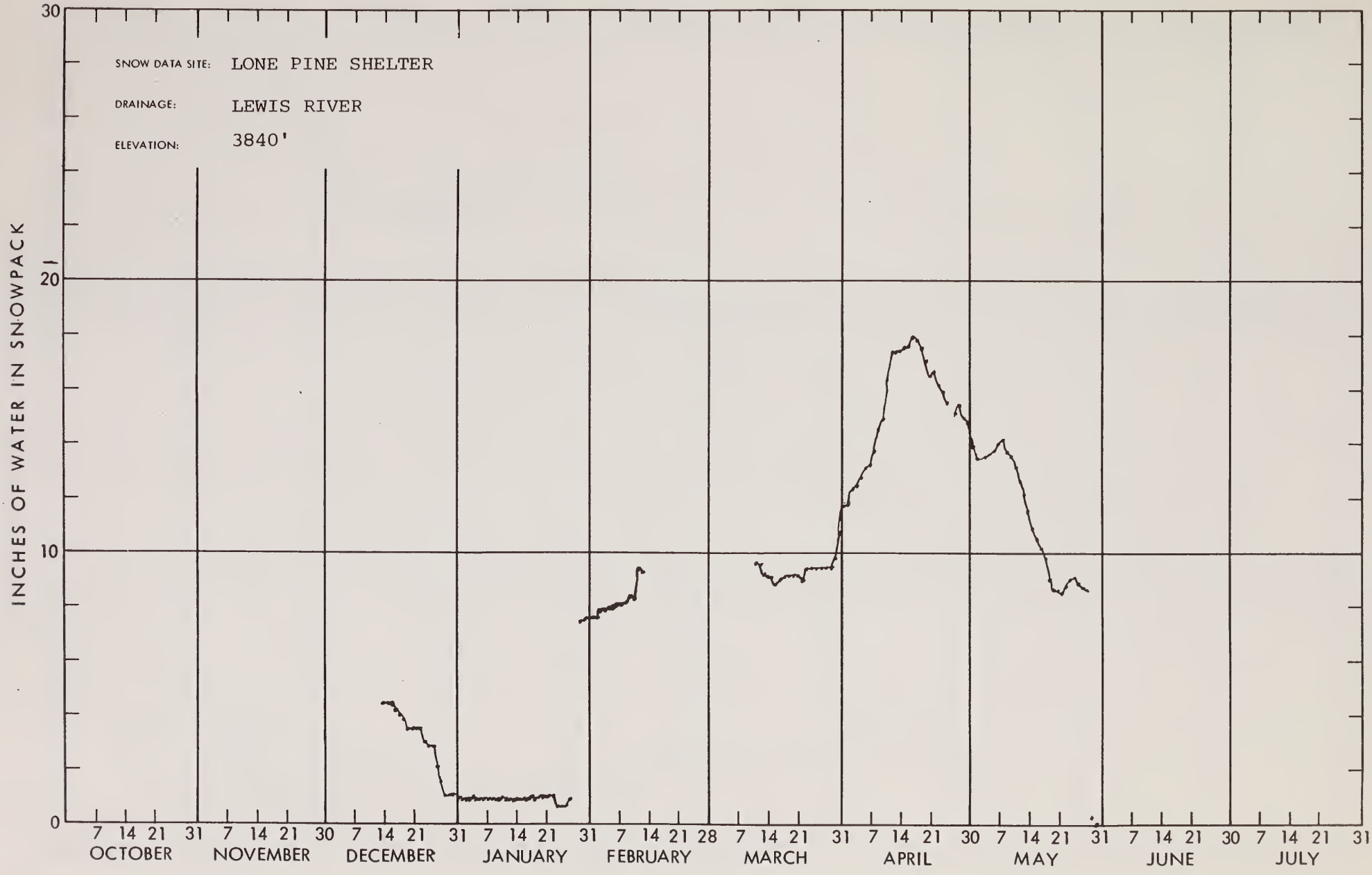
SNOW DATA SITE: LONE PINE SHELTER
DRAINAGE: LEWIS RIVER
ELEVATION: 3840'
INCHES OF WATER IN SNOWPACK
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7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 31 7 14 21 28 7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 30 7 14 21 31
OCTOBER
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JULY

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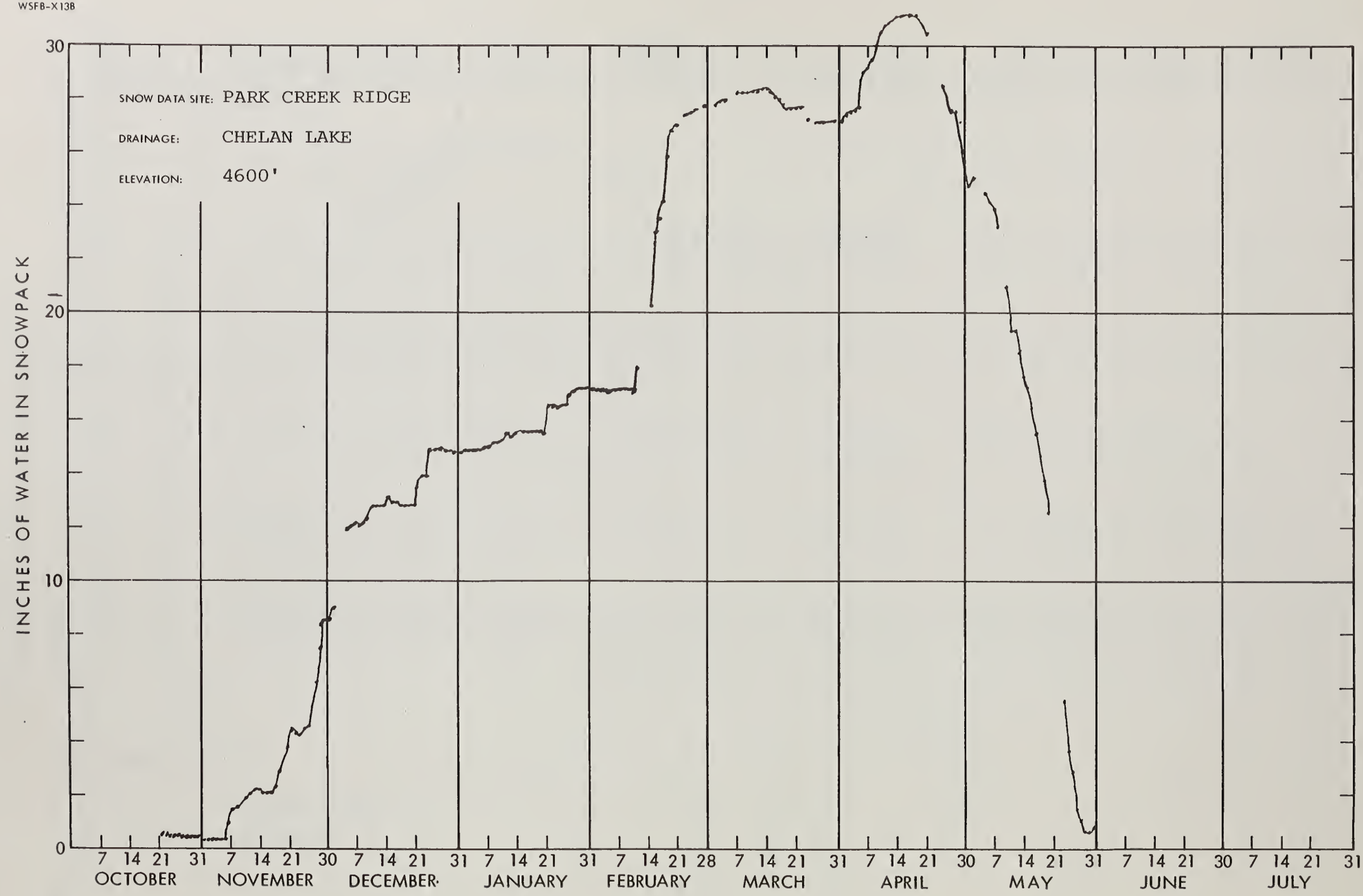
SNOW DATA SITE: PARK CREEK RIDGE
DRAINAGE: CHELAN LAKE
ELEVATION: 4600'
INCHES OF WATER IN SNOWPACK
30
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7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 31 7 14 21 28 7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 30 7 14 21 31
OCTOBER
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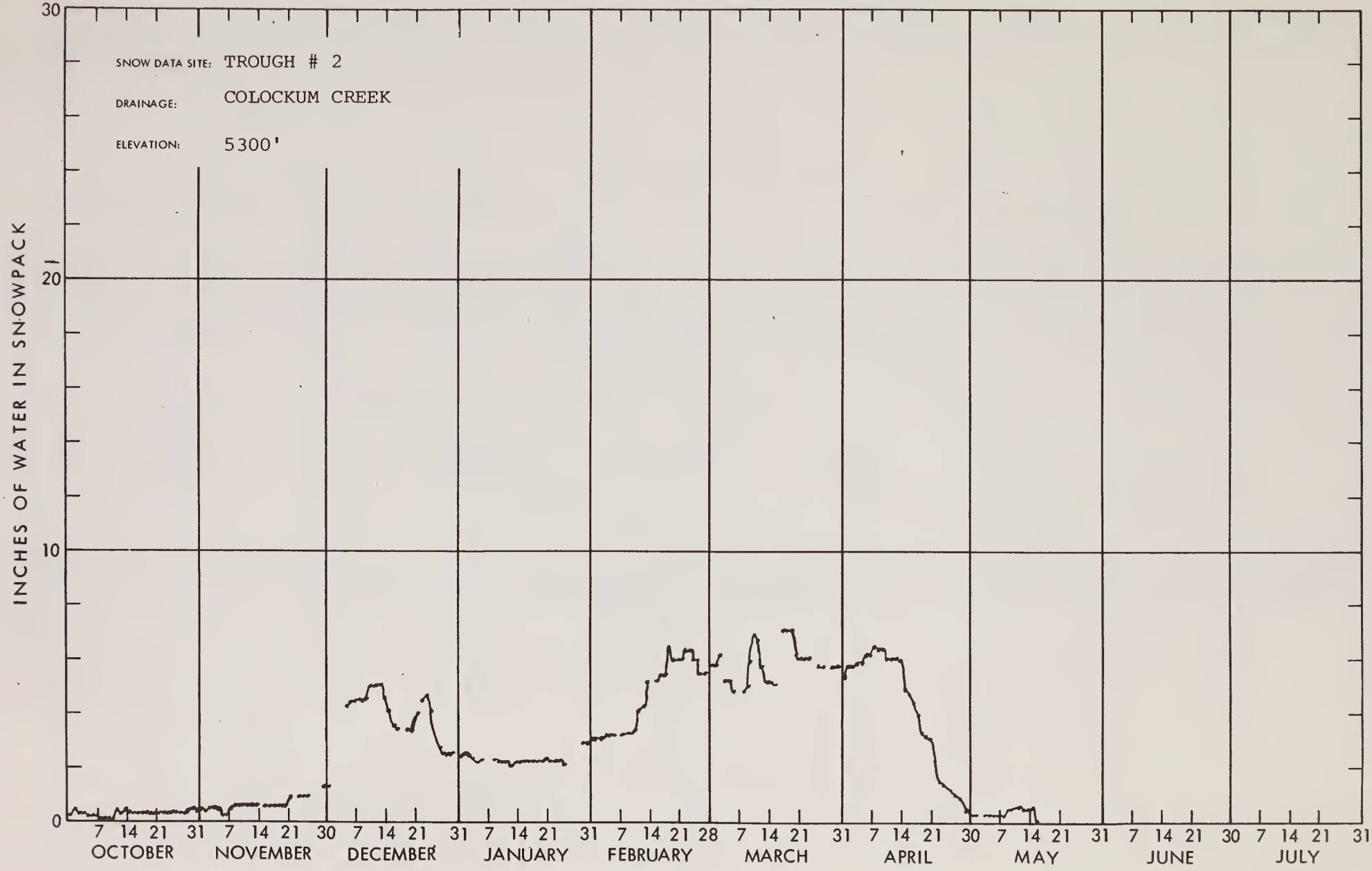
SNOW DATA SITE: TROUGH # 2
DRAINAGE: COLOCKUM CREEK
ELEVATION: 5300'
INCHES OF WATER IN SNOWPACK
30
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7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 31 7 14 21 28 7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 30 7 14 21 31
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JULY

SNOW DATA TO JUNE 1, 1981 - APPENDIX 1

SNOW			THIS YEAR			PAST RECORD	
DRAINAGE BASIN and/or SNOW COURSE			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	Number	Elevation				Last Year	Average #

U P P E R C O L U M B I A D R A I N A G E

PEND OREILLE RIVER

Baree Creek	15B11	5500	5/13	42	20.0	13.0	41.5
Baree Midway	15B16	4600	5/13	14	5.5	2.9	25.0
Baree Trail	15B15	3800	5/13	0	0.0	0.0	0.0
Heart Lake Trail	14C10	4800	5/17	0	0.0	-	10.2
			6/1	0	0.0	0.0	-
Hoodoo Basin	15C10	6000	5/17	67	33.6	30.0	50.5
			6/1	35	17.6	24.5	39.0
Hoodoo Creek	15C01	5900	5/17	61	28.7	28.0	46.2
			6/1	33	16.9	23.2	36.5
Lookout	15B02	5250	5/13	20	8.6	2.4	30.9
			5/29	0	0.0	0.0	15.0
Nelson	2D04-Can	3050	5/15	0	0.0	0.0	1.0*
Schweitzer Ridge	16A05	6100	5/29	26	13.2	5.4	-

KETTLE RIVER

Big White Mtn.	2E03-Can	5500	5/18	44	18.1	0.0	16.9*
			5/31	19	7.6	0.0	9.9*
Graystoke Lake	2F04-Can	5950	5/15	29	10.2	-	21.3*
Monashee Pass	2E01-Can	4500	5/14	18	8.1	0.0	8.5*
			5/29	0	0.0	-	1.9*

SPOKANE RIVER

Granite Peak	15B13A	6000	5/29	25	9.4	-	31.5
Lookout	15B02	5250	5/13	20	8.6	2.4	30.9
			5/29	0	0.0	0.0	15.0
Lost Lake	15B14A	6000	5/29	38	16.2	-	46.4

OKANOGAN RIVER

Blackwall Mountain	2G03-Can	6250	5/15	61	24.8	18.9	35.2*
			5/28	40	18.6	14.1	27.4*
Brenda Mine	2F18-Can	4800	5/14	3.1	0.9	0.0	1.9*
Brookmere	1C01-Can	3200	5/15	0	0.0	0.0	1.8*
Enderby	1F04-Can	6250	5/14	92	41.7	26.1	43.1*
			5/28	67	33.0	17.5	38.9*
Grayback Res.	2F08-Can	5225	5/14	15	4.3	0.0	4.9*
			5/29	0	0.0	-	0.9*
Graystoke Lake	2F04-Can	5950	5/15	29	10.2	-	21.3*
Hamilton Hill	2G06-Can	4900	5/13	4.3	1.6	0.0	6.1*
Isintok Lake	2F11-Can	5510	5/13	0	0.0	0.0	4.4*
Lost Horse Mountain	2G04-Can	6300	6/1	0	0.0	-	4.1*

\# Average based on 1963-1977 period

* Average for years of record

USDA-SCS-PORTLAND OREGON 1973

SNOW DATA TO JUNE 1, 1981 - APPENDIX 2

SNOW

DRAINAGE BASIN and/or SNOW COURSE NAME	Number	Elevation	THIS YEAR Date of Survey	Snow Depth (Inches)	Water Content (Inches)	PAST RECORD Water Content (inches) Last Year	Average #
OKANOGAN RIVER (Cont.)							
McCulloch	2F03-Can	4200	5/13	0	0.0	0.0	0.5*
Missezula Mountain	2G05-Can	5100	5/14	0	0.0	0.0	2.4*
Mission Creek	2F05-Can	6000	5/15	45	16.5	3.4	19.0*
			5/29	24	10.0	0.0	12.2*
Monashee Pass	2E01-Can	4500	5/14	18	8.1	0.0	8.5*
			5/29	0	0.0	-	1.9*
Mount Kobau	2F12-Can	5950	5/12	23	9.3	1.5	9.3*
			5/31	0	0.0	0.0	3.9*
Silver Star Mountain	2F10-Can	6050	5/16	54	21.7	3.9	25.4*
			5/31	18	7.0	0.0	16.3*
Summerland Reservoir	2F02-Can	4200	5/13	0	0.0	0.0	2.1*
Trout Creek	2F01-Can	4700	5/15	3.5	0.5	0.0	1.7*
Vaseux Creek	2F20-Can	4600	5/14	0	0.0	0.0	0.2*
White Rocks Mountain	2F09-Can	6000	5/13	28	11.7	0.0	17.7*
			6/1	0	0.0	-	11.3*
WENATCHEE RIVER							
Stevens Pass	21B01	4070	5/14	25	11.2	25.2	48.8
			5/29	0	0.0	16.5	40.6
Stevens Pass Sand Shed	21B45	3700	5/14	0	0.0	1.5	25.4
			5/29	0	0.0	0.0	18.7
YAKIMA RIVER							
Stampede Pass SP	21B10	3860	5/18	4.1	2.0	4.7	41.7
L O W E R C O L U M B I A D R A I N A G E							
LEWIS RIVER							
Lone Pine Shelter	21C26	3800	5/15		10.9	SNOTEL	-
			6/1		0.0	SNOTEL	-
Marble Mountain	22C05	3200	5/15		0.0	SNOTEL	-
			6/1		0.0	SNOTEL	-
Plains of Abraham	22C01	4400	5/15		2.3	SNOTEL	-
			6/1		0.0	SNOTEL	-
COWLITZ RIVER							
Ryan Lake	22C08	3280	5/14		6.1	SNOTEL	-
			5/29		2.2	SNOTEL	-
Sheep Canyon	22C10	4920	5/15		3.5	SNOTEL	-
			6/1		0.0	SNOTEL	-

\# Average based on 1963-77 period
* Average for years of record

USDA-SCS-PORTLAND OREGON 1973

SNOW DATA TO JUNE 1, 1981 - APPENDIX 3

SNOW			THIS YEAR			PAST RECORD	
DRAINAGE BASIN and/or SNOW COURSE			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	Number	Elevation				Last Year	Average #
PUGET SOUND DRAINAGE							
SKYKOMISH RIVER							
Stevens Pass	21B01	4070	5/14	25	11.2	25.2	48.8
			5/29	0	0.0	16.5	40.6
Stevens Pass Sand Shed	21B45	3700	5/14	0	0.0	1.5	25.4
			5/29	0	0.0	0.0	18.7
GREEN RIVER							
Stampede Pass SP	21B10	3860	5/18	4.1	2.0	4.7	41.7
BAKER RIVER							
Dock Butte	21A11A	3800	4/30	49	22.0	52.0	79.3
			6/1	Late Report		-	57.2
Easy Pass	21A07A	5200	4/30	101	45.0	63.0	97.6
			6/1	Late Report		-	75.8
Jasper Pass	21A06A	5400	4/30	123	55.0	71.0	99.8
			6/1	Late Report		-	85.6
Marten Lake	21A09A	3600	4/30	73	33.0	53.0	87.0
			6/1	Late Report		-	68.9
Mount Blum +	21A18a	5800	4/30	Not Measured		57.0	76.1
			6/1	Late Report		-	72.1
Panorama New	21A26	4300	5/29	0	0.0	-	74.2
Rocky Creek	21A12A	2100	4/30	0	0.0	0.0	28.4
			6/1	Late Report		-	2.2
Schreibers Meadow	21A10A	3400	4/30	26	12.0	30.0	70.5
			6/1	Late Report			46.3
S. F. Thunder Creek	21A14A	2200	4/30	Not Measured		0.0	2.0
Watson Lakes	21A08A	4500	4/30	52	23.0	45.0	77.7
			6/1	Late Report		-	62.6
NOOKSACK RIVER							
Panorama New	21A26	4300	5/29	0	0.0	-	74.2

\# Average based on 1963-1977 period
\+ Snow water equivalent estimated from aerial stadia observation

USDA-SCS-PORTLAND, OREGON-1973

SNOW DATA TO JUNE 1, 1981 - APPENDIX 4

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
NAME	Number	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches) Last Year	Water Content (inches) Average #

CORRECTIONS AND ADDITIONS - 1981 SNOW REPORTS

February 1

OKANOGAN & METHOW RIVERS

Mutton Creek No. 2 SP	19A11	6000	1/28	-	1.4	5.7	New

April 1

SPOKANE RIVER

Forty Nine Meadows	15B03	5000	4/8	48	16.2	19.7	32.5
Granite Peak	15B13A	6000	4/8	92	22.1	33.8	46.8
Lost Lake	15B14A	6000	4/8	113	34.3	40.3	61.8

SKAGIT RIVER

Thunder Basin	20A07	4200	3/28	18	5.2	13.4	24.7

USDA SCS PORTLAND OREGON 1973

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Ministry of the Environment, Water
Investigations Branch, Victoria, British Columbia

States:

Washington State Department of Ecology
Washington State Department of Natural Resources

Federal:

Department of the Army
  Corps of Engineers
U. S. Department of Agriculture
  Forest Service
U. S. Department of Commerce
  NOAA, National Weather Service
U. S. Department of the Interior
  Bonneville Power Administration
  Bureau of Reclamation
  Geological Survey
  National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District
Wenatchee Heights Irrigation District

MUNICIPALITIES

City of Tacoma
City of Seattle

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

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